CLAIMS

Add A1

1. A polishing apparatus comprising:

a polishing table; and

a work holding plate,

wherein a work held on the work holding plate is polished supplying a polishing agent solution, and in polishing action, an amount of deformation of the polishing table in a direction normal to an upper surface thereof and/or an amount of deformation of the work holding plate in a direction normal to a work holding surface thereof is restricted to 100 μm or less.

2. A polishing apparatus comprising:

a polishing table; and

a work holding plate,

wherein a work held on the work holding plate is polished supplying a polishing agent solution, and the polishing table is formed in one-piece by casting, a structure of the polishing table is such that a plurality of recesses and/or a plurality of ribs are provided on a rear surface thereof, a flow path for a temperature adjusting fluid is formed inside of the polishing table, and portions in each of which the flow path is not formed act as an internal rib structure.

3. A polishing apparatus according to claim 1 or 2, wherein a value of a thermal expansion coefficient of a material of the polishing table is 5×10^{-6}/°C or less and corrosion resistance of the material is almost equal to that of stainless steel.

4. A polishing apparatus according to claim 3, wherein the material of the

polishing table is invar.

5. A polishing apparatus comprising:

a polishing table; and

a work holding plate,

wherein a work held on the work holding plate is polished supplying a polishing agent solution, and temperature changes of the polishing table and/or temperature changes of the work holding plate in polishing action are controlled within a prescribed range by controlling a flow rate and/or a temperature of a temperature adjusting fluid.

6. A polishing apparatus according to claim 5, wherein temperature changes at any position of the polishing table and/or the work holding plate in polishing action are preferably within 3°C.

7. A polishing apparatus according to any of claims 1 to 6, wherein temperature changes at any position on a polishing surface of the polishing cloth in polishing action are controlled to 10°C or less by controlling a temperature and/or a flow rate of the polishing agent solution.

8. A polishing apparatus according to any of claims 1 to 7, wherein rotational unevenness of the polishing table is restricted to 1 % or less.

9. A polishing apparatus according to any of claims 1 to 8, wherein surface displacement in rotation of a polishing surface of the polishing table is restricted to 15 μm or less.

10. A polishing apparatus according to any of claims 1 to 9, wherein displacement in rotation of a rotary shaft of the polishing plate is restricted to 30 μm or less.

11. A polishing apparatus according to any of claims 1 to 10, wherein the

work holding plate has recesses or a rib structure formed on a rear surface thereof.

12. A polishing apparatus according to claim 11, wherein a material of the work holding plate is alumina ceramics or SiC.

13. A polishing apparatus according to claim 12, wherein a plurality of fine holes for vacuum chucking a work are opened in a region of the work holding plate where the work is adhered.

14. A polishing method using a polishing apparatus with a polishing table and a work holding plate, wherein a work held on the work holding plate is polished supplying a polishing agent solution, and in polishing action, an amount of deformation of the polishing table in a direction normal to an upper surface thereof and/or an amount of deformation of the work holding plate in a direction normal to a work holding surface thereof is restricted to 100 μm or less.

15. A polishing method using a polishing apparatus with a polishing table and a work holding plate, wherein a work held on the work holding plate is polished supplying a polishing agent solution, and when a to-be-polished surface of the work is polished by a polishing cloth adhered on the polishing table, temperature changes at any position on a polishing surface of the polishing cloth in polishing action are controlled to 10°C or less.

16. A polishing method using a polishing apparatus with a polishing table and a work holding plate, wherein a work held on the work holding plate is polished supplying a polishing agent solution, and temperature changes of the work in polishing operation are restricted to 10°C or less.

17. A polishing method according to claim 15 or 16, wherein temperature

changes at any position on a polishing surface of a polishing cloth and/or temperature changes of a wafer in polishing action are controlled to 10°C or less by controlling a temperature and/or a flow rate of the polishing agent solution.

18. A polishing method using a polishing apparatus a polishing table and a work holding plate, wherein a plurality of works held on the work holding plate are polished, and the plurality of wafers are arranged and held on the work holding plate so as to satisfy a relationship expressed by the following formula (1) with errors within 2 mm:

$$R = \{(r + x) + \sin(\pi/N)(r + 2y)\} / \sin(\pi/N) \cdots (1)$$

(in the above formula (1), R : a diameter of a work holding plate (mm), r : a diameter of a wafer (mm), x : a distance between two adjacent wafers (mm), y : a distance between a wafer and a peripheral edge of the work holding plate (mm), N : the number of wafers per work holding plate and π : the ratio of the circumference to its diameter.)

19. A polishing method according to claim 18, wherein r is 200 mm or more, and $5 \leqq N \leqq 7$, $5 \leqq x \leqq 20$ and $7 \leqq y \leqq 22$.

20. A polishing method according to claim 19, wherein a thickness d of the work holding plate is determined such that $aR < d < bR$ (a = 0.04 to 0.08 and b = 0.10 to 0.12).

21. A polishing method according to any of claims 14 to 19, wherein a silicon wafer is polished using a polishing apparatus according to any of claims 1 to 13.

22. A polishing method according to claim 21, wherein the polishing operation is performed in an environment where temperature changes are

restricted within ± 2°C.

23. A method for adhering a work, where a work holding plate with a plurality of fine holes opened in an adhering region thereof for vacuum chucking a wafer is used and the wafer is adhered with an adhesive on the work holding plate by evacuating air through the plurality of fine holes from the rear side of the work holding plate.

24. A method according to claim 23, wherein the adhering operation is performed at a temperature in the range of 20 to 30°C.

25. A method according to claim 24, wherein the adhesive with a viscosity in the range of 1 mPa·s to 10 mPa·s at the adhering temperature is used.

26. A method according to any of claims 23 to 25, wherein a thickness of the adhesive in a region where the work is adhered is in the range of 0.1 μm to 0.5 μm on the average and a deviation of the thickness is 0.015 μm or less.

27. A work holding plate, wherein a plurality of suction holes for vacuum chucking a work are formed in an adhering region on a work adhering surface of the work holding plate, each of the holes penetrating from the work adhering surface of the work holding plate to a rear surface thereof.

28. A work holding plate according to claim 27, wherein recesses or a rib structure is provided on a rear surface of the work holding plate.

29. A method according to any of claims 23 to 26, wherein a work holding plate according to claim 27 or 28 is used.

30. A polishing method, wherein a silicon wafer is polished in such a state to be adhered and held on the work holding plate by means of an adhering method according to any of claims 23 to 26 and 29.

31. A polishing method according to claim 30, wherein a polishing apparatus

according to any of claims 1 to 13 is used.